Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Previously Presented) A glass or glass-ceramic sealant composition comprising:

a glass constituted from a mixture of alkali-free inorganic oxides, the mixture including, on a mole basis, 20 to 50 % BaO, 1 to 10% Y_2O_3, 5 to 20% B_2O_3, 10 to 30% SiO_2, 3 to 35% MgO, 2 to 20% CaO, 1 to 10% ZnO, and 0 to 5% ZrO_2, wherein the glass or glass-ceramic sealant composition upon heating to a temperature above its softening point devitrifies and crystallizes, and wherein the glass or glass-ceramic sealant composition is adapted to seal solid oxide fuel cell components.

2. (Previously Presented) A composite sealant composition comprising:

a glass component constituted from a mixture of alkali-free inorganic oxides, wherein the glass component comprises, on a mole basis, 20 to 50 % BaO, 1 to 10% Y_2O_3, 5 to 20% B_2O_3, 10 to 30% SiO_2, 3 to 35% MgO, 2 to 20% CaO, 1 to 10% ZnO, and 0 to 5% ZrO_2; and

a filler component dispersed in the glass component, said filler component being up to 40% by weight of the composition, wherein the glass component upon heating to a temperature above its softening point will devitrify and crystallize to transform the glass component into a glass-ceramic matrix in which the filler component is dispersed.

3. (Cancelled).

4. (Original) The composition of claim 1, wherein the glass component comprises on a mole basis 25 to 35% BaO.

5. (Original) The composition of claim 1, wherein the glass component comprises on a mole basis 1 to 3% Y_2O_3.

6. (Original) The composition of claim 1, wherein the glass component comprises on a mole basis 14 to 18% B_2O_3.

7. (Original) The composition of claim 1, wherein the glass component comprises on a mole basis 15 to 25% SiO_2.

8. (Original) The composition of claim 1, wherein the glass component comprises on a mole basis 10 to 20% MgO.

9. (Original) The composition of claim 1, wherein the glass component comprises on a mole basis 10 to 18% CaO.

10. (Original) The composition of claim 1, wherein the glass component comprises on a mole basis 1 to 3% ZnO and 1 to 2% ZrO_2.

11. (Original) The composition of claim 2, wherein the filler component is non-metal.

12. (Original) The composition of claim 2, wherein the filler component comprises zirconia, alumina, barium titanate, strontium titanate, or a combination thereof.

13. (Original) The composition of claim 2, wherein the filler component comprises yttria-stabilized zirconium oxide.

14. (Original) The composition of claim 13, wherein the filler component further comprises barium titanate.

15. (Original) The composition of claim 2, wherein the glass component and the filler component are mixed with a binder system which comprises one or more thermoplastic polymers.

16. (Original) The composition of claim 15, which is in the form of a tape.

17. (Cancelled).

18. (Original) A composite sealant composition comprising:

a glass component including, on a mole basis, 25 to 35 % BaO, 1 to 3% Y_2O_3, 14 to 18% B_2O_3, 15 to 25% SiO_2, 10 to 20% MgO, 10 to 18% CaO, 1 to 3% ZnO, and 1 to 2% ZrO_2; and

a filler component dispersed in the glass component, said filler component being up to 40% by weight of the composition.

19. (Original) The composition of claim 18, wherein the filler component is selected from the group consisting of zirconia, alumina, barium titanate, strontium titanate, and combinations thereof.

20. (Currently Amended) A solid oxide fuel cell stack comprising:

a first structural component;

a second structural component; and

a sealant composition disposed between and contacting the first component and the second component, wherein the sealant composition comprises a glass component which comprises a mixture of alkali-free inorganic oxides, wherein the glass component comprises, on a mole basis, 20 to 50 % BaO, 1 to 10% Y_2O_3, 5 to 20% B_2O_3, 10 to 30% SiO_2, ~~4 to 35% MgO~~ 3 to 35% MgO, 2 to 20% CaO, 1 to 10% ZnO, and 0 to 5% ZrO_2; and a filler component dispersed in the glass component, said filler component being up to 40% by weight of the composition, wherein the glass component upon heating to a temperature above its softening point will devitrify and crystallize to transform the glass component into a glass-ceramic matrix in which the filler component is dispersed.

21. (Original) The fuel cell stack of claim 20, wherein the first component is a first fuel cell and the second component is a separator plate.

22. (Original) The fuel cell stack of claim 20, wherein the first component is a stack of two or more fuel cells and the second component is a manifold for directing fuel and oxidant into and out of the stack.

23. (Currently Amended) A process for sealing a fuel cell stack, comprising the steps of:

forming a composite sealant mixture comprising a glass component, which comprises a mixture of alkali-free inorganic oxides, wherein the glass component comprises, on a mole basis, 20 to 50 % BaO, 1 to 10% Y_2O_3, 5 to 20% B_2O_3, 10 to 30% SiO_2, ~~4 to 35% MgO~~ 3 to 35% MgO, 2 to 20% CaO, 1 to 10% ZnO, and 0 to 5% ZrO_2, in which a filler component is dispersed, wherein the filler component is up to 40% by weight of the total weight of the glass component and the filler component, wherein the glass component upon heating to a temperature above its softening point will devitrify and crystallize to transform the glass component into a glass-ceramic matrix in which the filler component is dispersed;

applying the composite sealant mixture to a selected location of the fuel cell stack; and

transforming the composite sealant mixture to seal the selected sealant location.

24. (Cancelled).

25. (Original) The process of claim 23, wherein the composite sealant mixture is applied in the form of a paste or a tape.

26. (Original) The process of claim 23, wherein the composite sealant mixture further comprises an organic binder material.

27. (Original) The process of claim 23, wherein the transformation step comprises heating the sealant mixture to a temperature above the softening point of the glass component to devitrify and crystallize the glass component, transforming it into a glass-ceramic matrix in which the filler component is dispersed.

28. (Original) The process of claim 23, wherein the seal of the fuel cell stack is effective under pressure differentials up to 5 psig.

29. (Previously Presented) The composition of claim 2, wherein a seal formed by the composite sealant composition is effective under a pressure differential up to 5 psig.